TOSHIBA

SERVICE MANUAL

AIR-CONDITIONER

SPLIT BUILT-IN DUCT TYPE

RAV-362B-PE/RAV-363A8-PE
RAV-462B-PE/RAV-463A8-PE

SPLIT CEILING TYPE

RAV-362C-PE/RAV-363A8-PE
RAV-462C-PE/RAV-463A8-PE

SPLIT CASSETTE TYPE

RAV-362U-PE/RAV-363A8-PE
RAV-462U-PE/RAV-463A8-PE

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SUMMARY

- The units referred to within this manual conform with the protection requirements of Directives 89/336/EEC Electromagnetic Compatibility and 73/23/EEC Low Voltage.
- Operating conditions of units are as follows:

OUTDOOR TEMPERATURE	-2 TO 43°C
ROOM TEMPERATURE	18 TO 32°C
ROOM HUMIDITY	LESS THAN 80%

NOTE 1: Cooling Capacity is based on the following temperature conditions
Indoor air inlet temperature 27°C DB, 19°C WB
Outdoor air inlet temperature 35°C DB

NOTE 2: Specifications are subject to change without notice.

1. IMPORTANT NOTES

a. Refer to Service Manual, **File No. A90-9504** for details of indoor units and control circuits.

b. Reverse Phase Protector

The Scroll Compressor used in this unit can only rotate in one direction. For this reason a protective device (Reverse Phase Protector) is fitted to prevent incorrect wiring of electrical phases. If the red LED on the remote controller does not flash when the system is switch on, then the wiring to the outdoor unit should be checked to ensure that the three phases are wired in the correct sequence.

c. Inner Overload Relay

If the Inner Overload Relay operates, the Magnetic contactor will remain energised, but the compressor will stop. In this event fault Code '09' will appear on the Remote Controller.

d. Delivery Temperature Thermostat.

In the unlikely event of a gas leak a bi-metal thermostat is fitted to this unit to prevent the compressor from overheating. During such abnormal conditions, the thermostat operates and power to the indoor unit and remote controller is disconnected.

e. Special Refrigerant Reclaim Procedure for Scroll Compressors

When the refrigerant charge is reclaimed only from the discharge side of the Scroll Compressor, it is possible that the suction side of the compressor remains pressurised. If a brazing torch is applied to the suction side the pressurised refrigerant and oil mixture could ignite.

THIS COULD RESULT IN A FIRE AND / OR SEVERE PERSONAL INJURY.

The refrigerant gas **MUST** be reclaimed simultaneously from the discharge and the suction sides of the outdoor unit to avoid this potential problem.

2. SPECIFICATIONS

ITEM		MODEL	RAV-362B-PE	RAV-462B-PE
Cooling capacity		kW	10.0	12.5
Power source		Phase	3	3
		V	380 – 415	380 – 415
		Hz	50	50
			COOLING	COOLING
Power consumption		kW	3.9	5.0
Power Factor		%	87	86
Running current		A	6.5	8.4
Starting current		A	42	50
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	45/42/39	46/43/40
	Outdoor unit	dB(A)	55	59
Refrigerant	Name of refrigerant		R-22	R-22
	Charge volume	kg	2.7	3.7
	Add. volume (20-50m)	g/m	50	50
Refrigerant control			Capillary tube	Capillary tube
Inter-connection pipe	Large side size *1	mm	ø 19 (ø 22)	ø 19 (ø 22)
	Coupler style		Flare	Flare
	Smaller side size	mm	ø 9.5	ø 9.5
	Coupler style		Flare	Flare
	Standard length	m	7.5	7.5
	Maximum pipe lengths	m	50	50
	Max. height difference if indoor unit higher	m	20	20
	Outdoor unit higher	m	50	50
Condensate drain pipe diameter		mm	ø 32 (OD)	ø 32 (OD)
INDOOR UNIT Model			RAV-362B-PE	RAV-462B-PE
Appearance colour			Black (Zinc galvanized steel + Thermal insulation)	
Dimensions	Height	mm	345	345
	Width	mm	1350	1350
	Depth	mm	800	800
Net weight		kg	53	62
Heat exchanger type			Finned tube	Finned tube
Indoor fan type			Multi-blade fan	Multi-blade fan
Air flow volume		m^3/h	1820	2100
Fan motor output		W	120	140
External Static Pressure	STANDARD	mmAq	4	4
	MAX. MOTOR	mmAq	10	10
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)
Dimensions	Height	mm	1240	1240
	Width	mm	930	930
	Depth	mm	385	385
Net Weight		kg	103	111
Heat exchange type			Finned tube	Finned tube
Outdoor fan type			Propeller fan	Propeller fan
Air flow volume		m^3/h	6000	6000
Fan motor output			39 + 63	39 + 63
Compressor	Model		ZR49K3-TFD	ZR61K3-TFD
	Output	kW	3.0	3.75
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat
Built-in duct filter kit			RBC-RK462BE-PE	
Air filter			Washable	

Note 1: (ø22) should be used when the length of pipe exceeds 30m.

Metric/Imperial Pipe Comparisons

Diameter (mm)	6.4	9.5	12.7	15.9	19	22
Nominal Diameter (inch)	1/4	3/8	1/2	5/8	3/4	7/8

ITEM \ MODEL			RAV-362C-PE	RAV-462C-PE
Cooling capacity		kW	10.0	12.5
Power source		Phase	3	3
		V	380 – 415	380 – 415
		Hz	50	50
			COOLING	COOLING
Power consumption		kW	3.9	5.0
Power Factor		%	87	86
Running current		A	6.5	8.4
Starting current		A	42	50
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	47/43/40	49/45/41
	Outdoor unit	dB(A)	55	59
Refrigerant	Name of refrigerant		R-22	R-22
	Charge volume	kg	2.7	3.7
	Add. volume (20-50m)	g/m	50	50
Refrigerant control			Capillary tube	Capillary tube
Inter-connection pipe	Large side size *1	mm	ø 19 (ø 22)	ø 19 (ø 22)
	Coupler style		Flare	Flare
	Smaller side size	mm	ø 9.5	ø 9.5
	Coupler style		Flare	Flare
	Standard length	m	7.5	7.5
	Maximum pipe lengths	m	50	50
	Max. height difference if indoor unit higher	m	20	20
	Outdoor unit higher	m	50	50
Condensate drain pipe diameter		mm	ø 20 (ID)	ø 20 (ID)
INDOOR UNIT Model			RAV-362C-PE	RAV-462C-PE
Appearance colour			Silky mist	Silky mist
Dimensions	Height	mm	240	240
	Width	mm	1430	1630
	Depth	mm	640	640
Net weight		kg	39	44
Heat exchanger type			Finned tube	Finned tube
Indoor fan type			Multi-blade fan	Multi-blade fan
Air flow volume		m^3/h	1680	2100
Fan motor output		W	75	75
Air filter			Washable	Washable
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)
Dimensions	Height	mm	1240	1240
	Width	mm	930	930
	Depth	mm	385	385
Net Weight		kg	103	111
Heat exchange type			Finned tube	Finned tube
Outdoor fan type			Propeller fan	Propeller fan
Air flow volume		m^3/h	6000	6000
Fan motor output			39 + 63	39 + 63
Compressor	Model		ZR49K3-TFD	ZR61K3-TFD
	Output	kW	3.0	3.75
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat

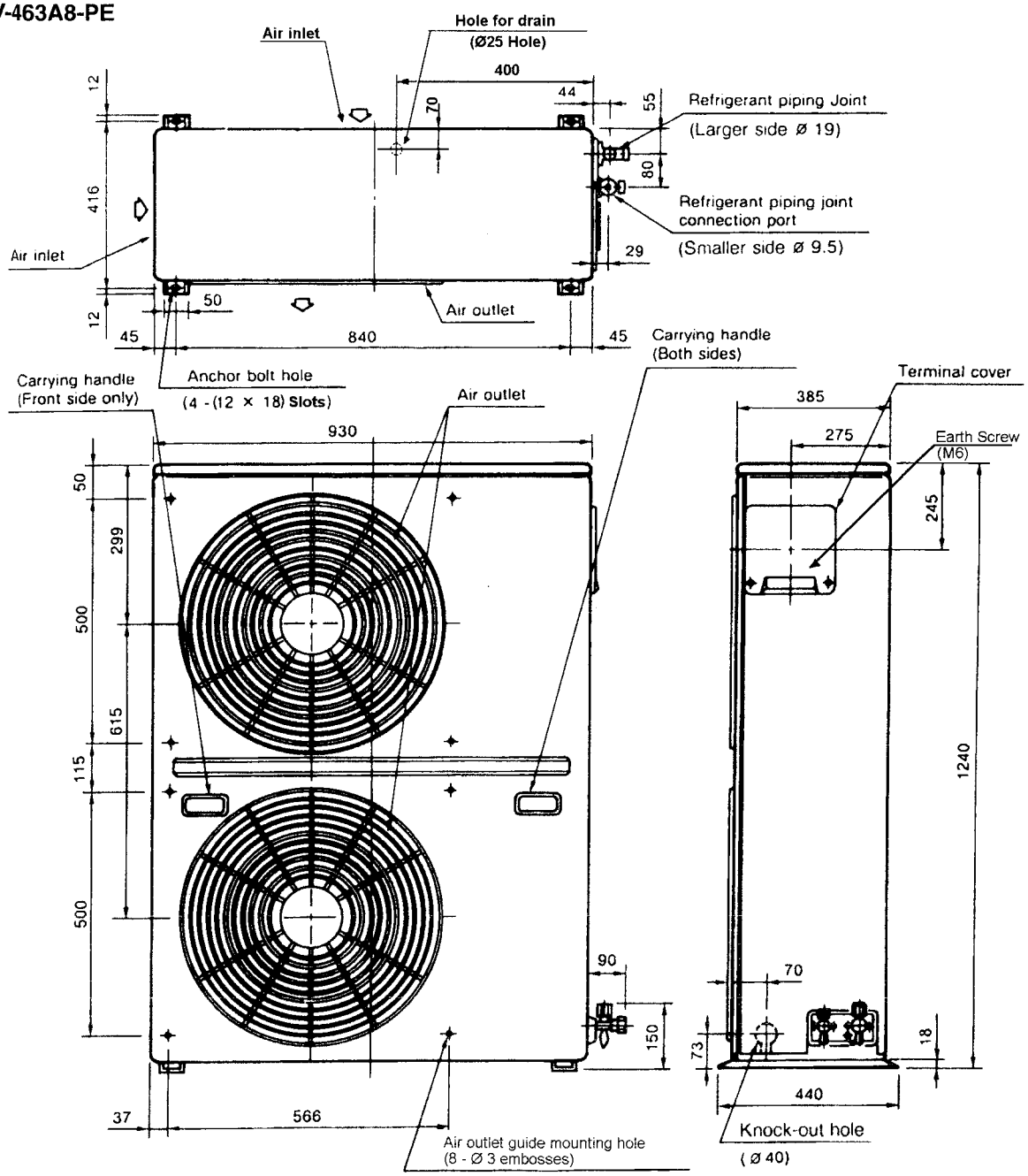
Note 1: (ø22) should be used when the length of pipe exceeds 30m.

ITEM \ MODEL			RAV-362U-PE	RAV-462U-PE
Cooling capacity		kW	10.0	12.5
Power source		Phase	3	3
		V	380 – 415	380 – 415
		Hz	50	50
			COOLING	COOLING
Power consumption		kW	3.9	5.0
Power Factor		%	87	86
Running current		A	6.5	8.4
Starting current		A	42	50
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	50/45/42	52/47/44
	Outdoor unit	dB(A)	55	59
Refrigerant	Name of refrigerant		R-22	R-22
	Charge volume	kg	2.7	3.7
	Add. volume (20-50m)	g/m	50	50
Refrigerant control			Capillary tube	Capillary tube
Inter-connection pipe	Large side size *1	mm	ø 19 (ø 22)	ø 19 (ø 22)
	Coupler style		Flare	Flare
	Smaller side size	mm	ø 9.5	ø 9.5
	Coupler style		Flare	Flare
	Standard length	m	7.5	7.5
	Maximum pipe lengths	m	50	50
	Max. height difference if indoor unit higher	m	20	20
	Outdoor unit higher	m	50	50
Condensate drain pipe diameter		mm	ø 32 (OD)	ø 32 (OD)
INDOOR UNIT Model			RAV-362U-PE	RAV-462U-PE
Appearance colour			Black (Zinc galvanized steel + Thermal insulation)	
Dimensions	Height	mm	350	350
	Width	mm	1130	1130
	Depth	mm	740	740
Net weight		kg	53	53
Heat exchanger type			Finned tube	Finned tube
Indoor fan type			Centrifugal Fan	Centrifugal Fan
Air flow volume		m^3/h	1680	1860
Fan motor output		W	80	90
CEILING PANEL Model			RBC-U462PG(W)-PE	RBC-U462PG(W)-PE
Appearance colour			Silky mist (Munsell 1Y8.9/0.5)	Silky mist (Munsell 1Y8.9/0.5)
Dimensions	Height	mm	28	28
	Width	mm	1290	1290
	Depth	mm	840	840
Net Weight		kg	10	10
Air filter			Washable	Washable
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)
Dimensions	Height	mm	1240	1240
	Width	mm	930	930
	Depth	mm	385	385
Net Weight		kg	103	111
Heat exchange type			Finned tube	Finned tube
Outdoor fan type			Propeller fan	Propeller fan
Air flow volume		m^3/h	6000	6000
Fan motor output			39 + 63	39 + 63
Compressor	Model		ZR49K3-TFD	ZR61K3-TFD
	Output	kW	3.0	3.75
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat

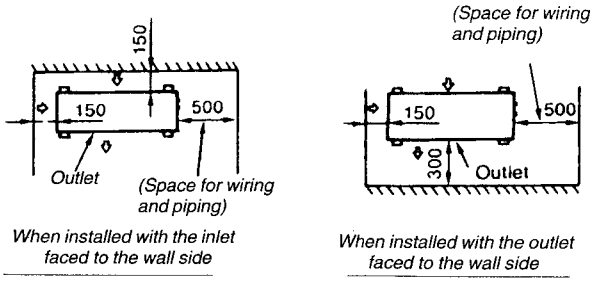
Note 1: (ø22) should be used when the length of pipe exceeds 30m.

3. CONSTRUCTION VIEWS

RAV-363A8-PE
RAV-463A8-PE



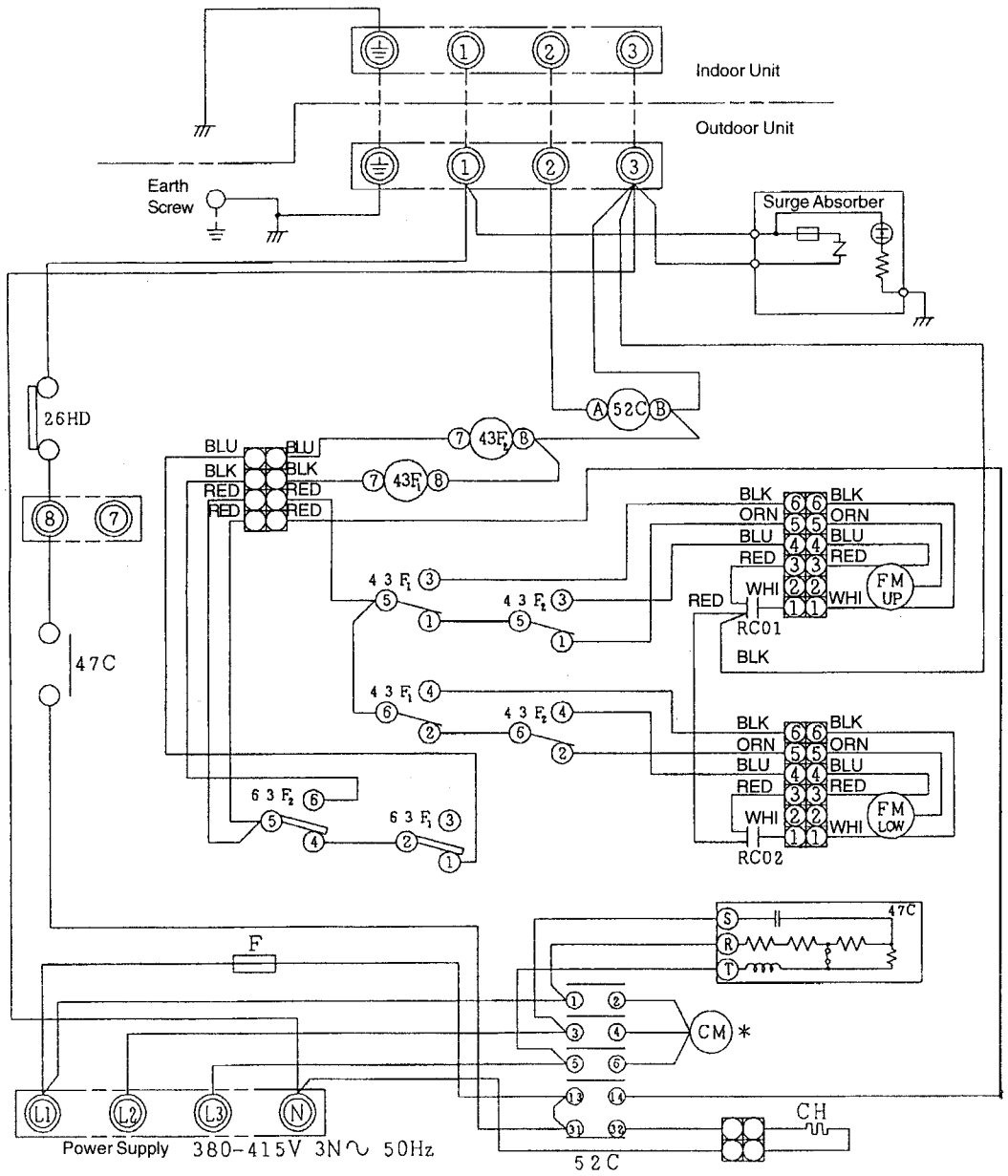
Space required for service



When installed with the inlet faced to the wall side

When installed with the outlet faced to the wall side

4. WIRING DIAGRAM



◎shows terminal block and figures show terminal numbers.
Broken lines show wiring at site.

Do not operate the units with the magnetic contactor pushed in.

* Compressor has internal thermal protection.

Symbol	Name	Symbol	Name	Symbol	Name
$63F_{1,2}$	2 Stage Pressure Switch	CM	Compressor	RC01,02	Running Capacitor
$43F_{1,2}$	Relay	52C	Magnetic Contactor	CH	Crankcase Heater
26HD	Bimetal Thermostat	FM UP,LOW	Fan Motor (Outdoor)	F	Fuse (T5A)
47C	Reverse Phase Protector				

5. SPECIFICATIONS OF ELECTRICAL PARTS

5.1 RAV-363A8-PE

No.	Parts Name	Type	Specifications
1	Compressor	ZR49K3-TFD	Output (Rated) 3.0kW, 2 pole, 3 phase, 380/415V, 50 Hz
			Winding resistance 3.73Ω, at 20 °C
2	Outdoor unit fan motor	SMF-230-63N-3	Output (Rated) 63W, 6 pole,1 phase, 230V, 50 Hz
		SMF-230-39N-3	Output (Rated) 39W, 6 pole,1 phase, 230V, 50 Hz
3	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 μF
4	Magnetic contactor	FMCa-1S	AC 230V, 50Hz,
5	Pressure switch (2-stage)	STB-X602	Tripping pressure 19 kg/cm²G, 21 kg/cm²G Resetting pressure 13 kg/cm²G, 15 kg/cm²G
6	Bimetal Thermostat	CS-7	Tripping temperature 135°C Resetting temperature 110°C
7	Crankcase heater		AC 240V, 28W
8	Fuse		T5A
9	Reverse Phase Protector	STR-4AB	

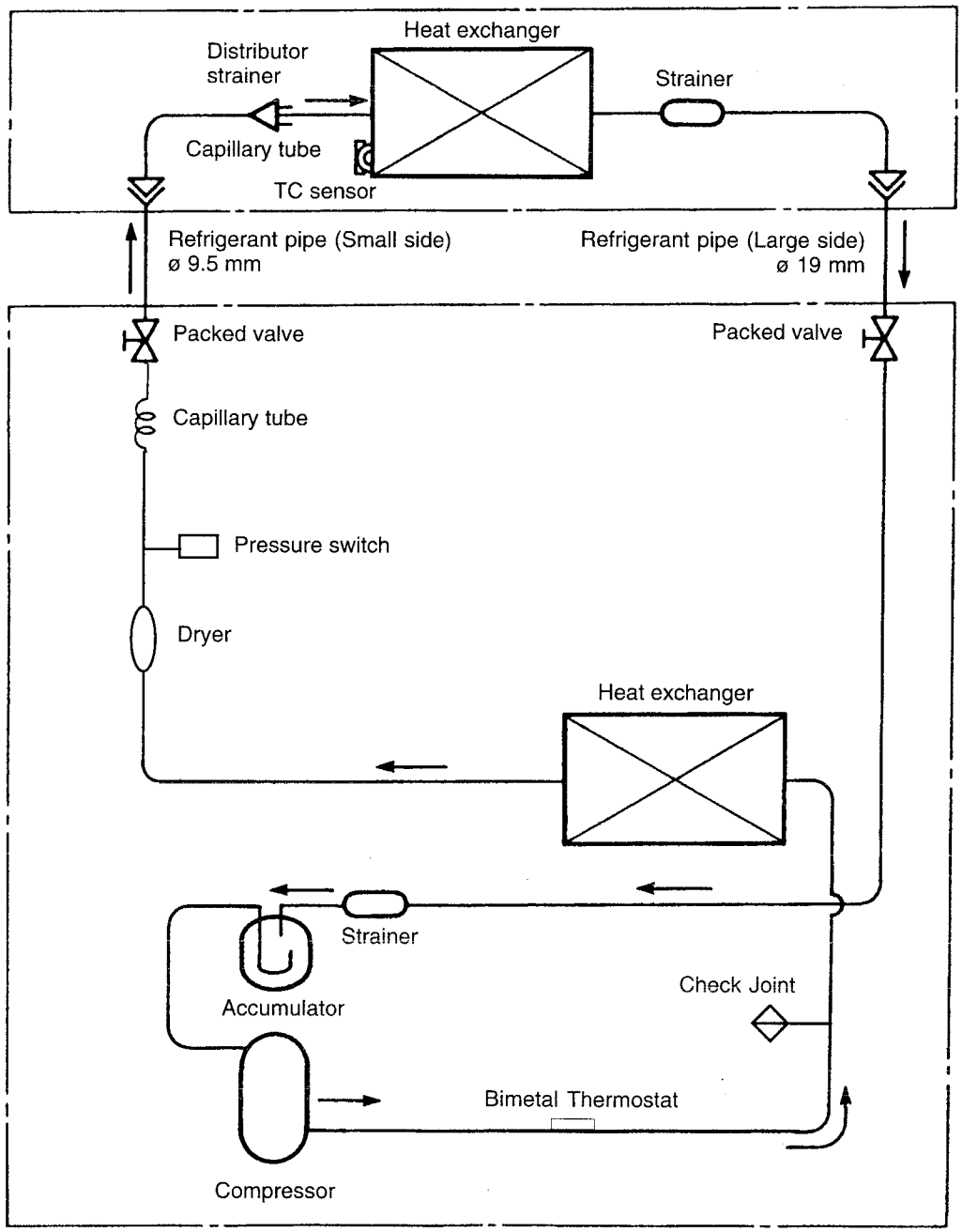
5.2 RAV-463A8-PE

No.	Parts Name	Type	Specifications
1	Compressor	ZR61K3-TFD	Output (Rated) 3.75kW, 2 pole, 3 phase, 380/415V, 50 Hz
			Winding resistance 2.91Ω, at 20 °C
2	Outdoor unit fan motor	SMF-230-63N-3	Output (Rated) 63W, 6 pole,1 phase, 230V, 50 Hz
		SMF-230-39N-3	Output (Rated) 39W, 6 pole,1 phase, 230V, 50 Hz
3	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 μF
4	Magnetic contactor	FMCa-1S	AC 230V, 50Hz,
5	Pressure switch (2-stage)	STB-X602	Tripping pressure 19 kg/cm²G, 21 kg/cm²G Resetting pressure 13 kg/cm²G, 15 kg/cm²G
6	Bimetal Thermostat	CS-7	Tripping temperature 135°C Resetting temperature 110°C
7	Crankcase heater		AC 240V, 28W
8	Fuse		T5A
9	Reverse Phase Protector	STR-4AB	

6. REFRIGERANT PIPING DIAGRAM

Indoor unit	Outdoor unit
RAV-362B-PE	RAV-363A8-PE
RAV-362C-PE	RAV-363A8-PE
RAV-362U-PE	RAV-363A8-PE
RAV-462B-PE	RAV-463A8-PE
RAV-462C-PE	RAV-463A8-PE
RAV-462U-PE	RAV-463A8-PE

Indoor unit

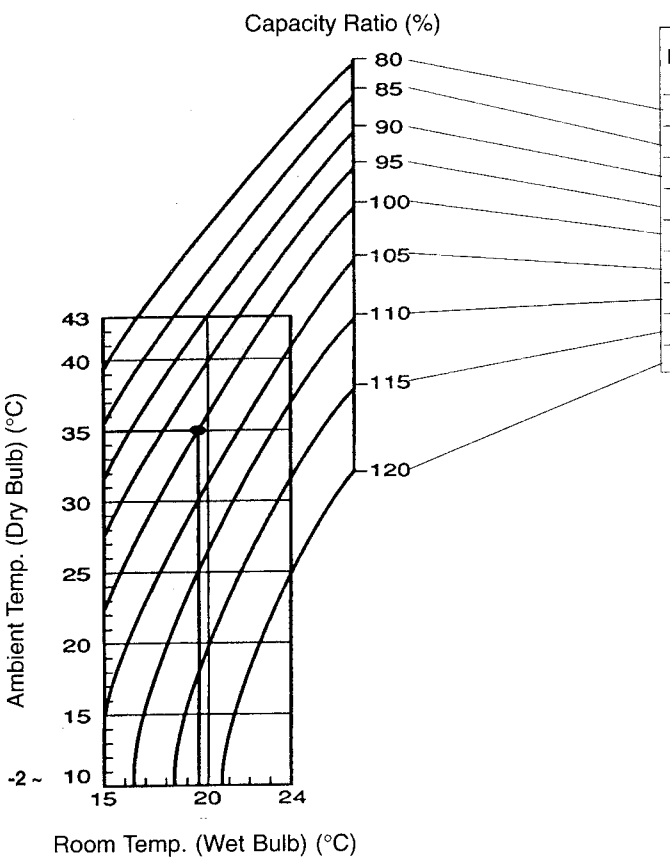


Outdoor unit

Indoor Unit		Outdoor Unit	
Model	Capillary	Model	Capillary
RAV-362B-PE RAV-362C-PE RAV-362U-PE	IDø2.0 x 400L x 6P IDø2.0 x 300L x 7P IDø2.0 x 300L x 8P	RAV-363A8-PE	IDø2.4 x 500L x 1P
RAV-462B-PE RAV-462C-PE RAV-462U-PE	IDø2.2 x 200L x 6P IDø2.0 x 200L x 8P IDø2.0 x 300L x 8P	RAV-463A8-PE	IDø2.6 x 700L x 1P

7. PERFORMANCE CHARACTERISTICS

7.1 Cooling capacity

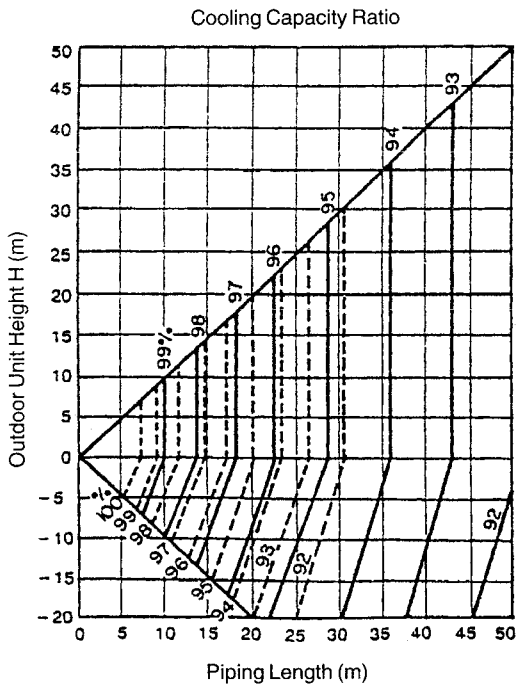


(KW)

RAV-363A8-PE	RAV-463A8-PE
8.00	10.00
8.50	10.63
9.00	11.25
9.50	11.88
10.00	12.50
10.50	13.13
11.00	13.75
11.50	14.38
12.00	15.00

7.2 Piping length/cooling capacity

RAV-363A8-PE
RAV-463A8-PE



The broken line shows in case the piping length is 30m or less.

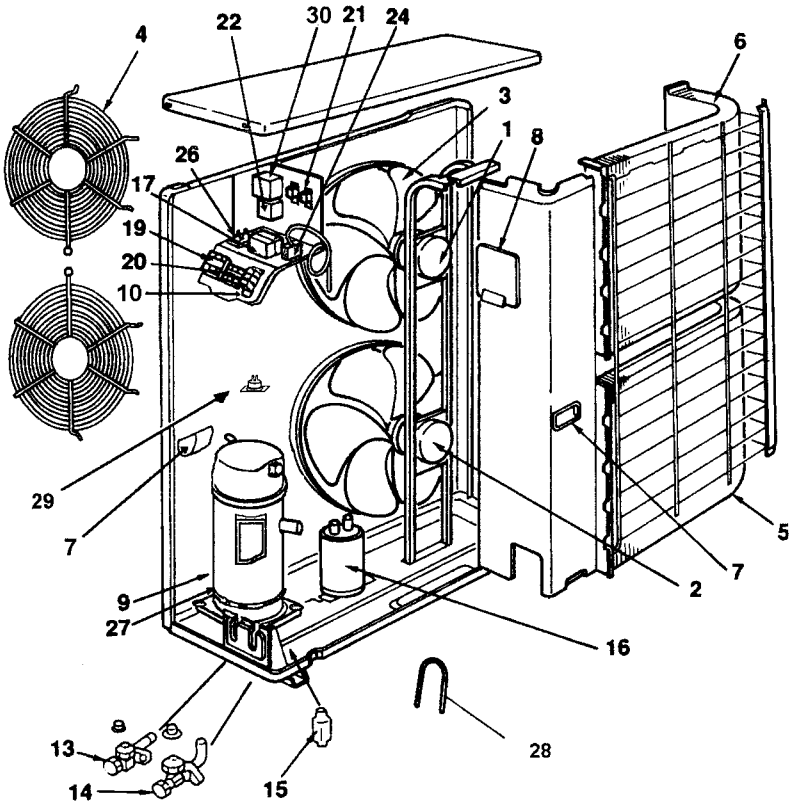
7.3 Piping length/additional refrigerant volume

Model \ Piping length less than (m)	20	Additional amount of refrigerant at installation site (kg)						Recharge quantity (kg)									
		25	30	35	40	45	50	5	10	15	20	25	30	35	40	45	50
RAV-463A8-PE	Filled at factory	0.25	0.5	0.75	1.0	1.25	1.5	3.3	3.45	3.55	3.7	3.95	4.2	4.45	4.7	4.95	5.2
RAV-363A8-PE	Filled at factory	0.25	0.5	0.75	1.0	1.25	1.5	2.3	2.45	2.55	2.7	2.95	3.2	3.45	3.7	3.95	4.2

- The amount of refrigerant put into the outdoor unit at the factory is equivalent to that which fills up 20m length of refrigerant pipe.
- If the length of refrigerant pipe is 20m or less, addition of refrigerant at the installation site is unnecessary. If the length of the pipe exceeds 20m, add the refrigerant R-22.
- Overcharge or undercharge of refrigerant in the outdoor unit will cause malfunction of the compressor. The prescribed amount to recharge the unit with refrigerant is shown in the table above.
  The permissible amount of refrigerant is the prescribed amount $\pm$ 50g.
- For RAV-363A8-PE and RAV-463A8-PE, if the length of pipe exceeds 30m the diameter of the gas pipe must be increased by one rank (i.e. Ø19.0 to Ø22.2).

8. EXPLODED VIEWS AND PARTS LISTS

RAV-363A8-PE
RAV-463A8-PE



Location No.	Part No.	Description
1	43A21011	Motor, Fan, SMF-230-63N-3
2	43A21012	Motor, Fan, SMF-230-39N-3
3	43120156	Fan, Propeller
4	43A19001	Guard-Fan
5	43143649	Condenser, Lower (RAV-363A8-PE)
5	43A43006	Condenser, Lower (RAV-463A8-PE)
6	43143651	Condenser, Upper (RAV-363A8-PE)
6	43A43005	Condenser, Upper (RAV-463A8-PE)
7	43119368	Hanger
8	43162027	Cover, Electric Parts
9	43A41500	Compressor, ZR49K3-TFD (RAV-363A8-PE)
9	43A41501	Compressor, ZR61K3-TFD (RAV-463A8-PE)
10	43A60006	Fuse F2 (T5A)
13	43146451	Packed Valve (3/8")

Location No.	Part No.	Description
14	43146416	Packed Valve (3/4")
15	43145064	Dryer
16	43148096	Accumulator
17	43155080	Capacitor, Plastic Film
19	43A60005	Terminal, 4P
20	43A60001	Terminal, 4P
21	43154141	Relay
22	43152334	Magnetic Contactor
24	43A49002	Pressure Switch, 2-stage
26	43169584	Surge Absorber
27	43157167	Heater, Crk. Case
28	43146430	Capillary Tube (RAV-363A8-PE)
28	43146459	Capillary Tube (RAV-463A8-PE)
29	43150112	Bimetal Thermostat
30	43154148	Reverse Phase Protector STR-4AB